

Transistors

TO-92L • TO-92LS • MRT

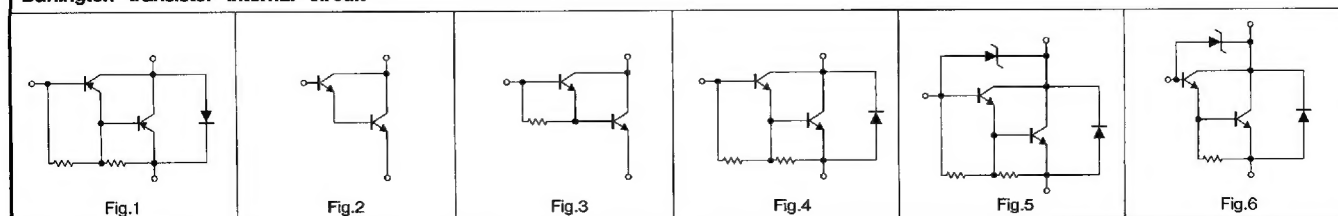
TO-92L is a high power version of TO-92 and TO-92LS is a slimmed TO-92L.

MRT is a 1.2W package power taped transistor designed for use with an automatic placement machine.

Application	Package			V_{CE0} (V) * V_{CES}	I_C (A)	I_C Max. (A)	P_c (W) ($T_a=25^\circ\text{C}$)			h_{FE}	h_{FE} Ranking code	V_{CE} (V)	I_C (mA)	Internal circuit
	TO-92L	TO-92LS	MRT				TO-92L	TO-92LS	MRT					
Part No.														
Low Noise	—	2SA1819	—	-150	-0.05	—	—	0.8	—	120~390	Q R	-6	-2	—
	—	2SC4720	—	-150	0.05	—	—	0.8	—	120~390	Q R	6	2	—
Driver	2SA934	2SA1818	2SB1329	-32	-1	-2	0.75	0.9	1.2	82~390	P Q R	-3	-100	—
	2SA935	2SA1902	2SB1330	-80	-0.7	—	0.75	0.9	1.2	82~390	P Q R	-3	-100	—
	2SB1010	2SB1595	2SB1331	-32	-2	-3	0.75	0.9	1.2	82~390	P Q R	-3	-500	—
	2SB1041	—	2SB1332	-80	-1	—	0.9	—	1.2	82~390	P Q R	-3	-100	—
	2SB1043	—	—	-50	-1	—	0.9	—	—	82~390	P Q R	-3	-100	—
	2SB1212	2SB1596	2SB1328	-160	-1.5	—	0.9	0.9	1.2	56~270	N P Q	-5	-100	—
	2SB1425	—	—	-20	-2	-3	1.0	—	—	270~1200	S E U	-6	-500	—
	—	—	2SB1517	-50	-3	—	—	—	1.2	56~390	N P Q R	-3	-500	—
	2SC2060	2SC4719	2SD2005	32	1	2	0.75	0.9	1.2	82~390	P Q R	3	100	—
	2SC2061	2SC5061	2SD2006	80	0.7	1	0.75	0.9	1.2	82~390	P Q R	3	100	—
	2SD1292	—	2SD2008	80	1	2	0.9	—	1.2	82~390	P Q R	3	500	—
	2SD1384	2SD2450	2SD2007	32	2	2.5	0.75	0.9	1.2	82~390	P Q R	3	500	—
	2SD1812	2SD2451	2SD2004	160	1.5	—	0.9	0.9	1.2	56~270	N P Q	5	100	—
	—	—	2SD2146	50	3	—	—	—	1.2	56~390	N P Q R	3	500	—
Low $V_{CE(sat)}$	—	2SA1903	—	-20	-3	—	—	0.9	—	82~390	P Q R	-2	-100	—
	2SB1374	2SA1820	—	-50	-2	-5	1.0	0.9	—	82~270	P Q	-2	-500	—
	—	2SC5062	—	20	3	—	—	0.9	—	120~560	Q R S	2	100	—
	2SD2069	2SC4721	—	50	2	5	1.0	0.9	—	82~270	P Q	2	500	—
Strobo Flash Low $V_{CE(sat)}$	2SB1306	—	2SB1482	-20	-5	-10	1.2	—	1.2	82~390	P Q R	-2	-500	—
	2SD1961	—	—	20	5	10	1.2	—	—	120~560	Q R S	2	500	—
Chroma	2SC3269	2SC4722	2SC4243	300	0.1	—	0.75	0.9	1.0	39~180	M N P	10	10	—
High h_{FE}	2SB1425	—	2SB1461	-20	-2	-3	1.0	—	1.2	270~820	S E	-6	-500	—
	2SD2159	—	—	25	2	3	1.0	—	—	390~2700	E U V W	6	500	—
High h_{FE} High V_{EBO}	2SD2172	—	—	25	1.2	2	1	—	—	560~2700	U V W	5	500	—
Darlington	2SB1256	—	2SB1333	-100	-2	—	1.2	—	1.2	1k~10k	—	-2	-1000	Fig.1
	—	—	2SB1515	-80	-4	—	—	—	1.2	1k~10k	—	-3	-2000	Fig.1
	—	—	2SD2452	31±4	2	3	—	—	1.2	1k~10k	—	2	1000	Fig.5
	2SD1809	—	2SD2009	60*	1	—	0.9	—	1.2	2k~	—	3	500	Fig.2
	2SD1929	—	2SD2010	60±10	2	—	1.2	—	1.2	1k~10k	—	2	1000	Fig.5
	2SD1930	—	2SD2011	100	2	—	1.2	—	1.2	1k~10k	—	2	1000	Fig.4
	—	—	☆2SC4724	100	3	5	—	—	1.2	2k~10k	—	2	1500	Fig.4
	2SD1931	—	—	60±10	1.5	—	0.9	—	—	1k~30k	—	2	1000	Fig.6
	—	—	2SD2308	80	4	—	—	—	1.2	1k~10k	—	3	2000	Fig.4
Darlington Driver	—	—	2SD2309	60	4	—	—	—	1.2	1k~10k	—	3	2000	Fig.3
	—	—	2SD2388	90 ⁺²⁰ ₋₁₀	2	3	—	—	1.2	1k~10k	—	2	1000	Fig.5
High Voltage SW	2SA1584	—	—	-400	-0.1	-0.2	0.9	—	—	56~270	N P Q	-10	-10	—
	2SA1780	2SA1884	2SA1809	-400	-0.5	-1	0.9	0.9	1.2	56~270	N P Q	-5	-50	—
	2SA1760	—	—	-400	-0.1	-0.2	0.9	—	—	56~270	N P Q	-10	-10	—
	—	—	2SA1861	-400	-2	-4	—	—	1.2	56~180	N P	-5	-100	—
	2SC4166	—	—	400	0.1	—	0.9	—	—	56~270	N P Q	10	10	—

Note : ☆Under development

Darlington transistor internal circuit



●Product Designation

- When ordering, specify the type.
- Check each code against the tables shown below.
- Fill a space with the next character.

Special code

- Omit for standard product.
- Factory assigned for custom product.

2 S A 9 3 4

Part No.

T 1 0 3

Packaging

Package	Code	Package specifications	Quantity / Package (pcs)
TO-92L	T103	Ammo box	2,500
	None	Bulk	500
TO-92LS	TE4	Ammo box	3,000
	None	Bulk	1,000
MRT	T105	Ammo box	2,000

h_{FE} Ranking code

Input h_{FE} rank signal display

One rank preferred ☒ P ☐

Multiple rank preferred ☒ P ☒ R

(Min., Max. is displayed)

Code	h _{FE} Range	Code	h _{FE} Range
L	27~56	E	390~820
M	39~82	U	560~1200
N	56~120	V	820~1800
P	82~180	W	1200~2700
Q	120~270	A	1k~
R	180~390	B	5k~
S	270~560	C	10k~

(Unit : mm)

TO-92L	TO-92LS	MRT
<p>(1) Emitter (2) Collector (3) Base</p>	<p>(1) Emitter (2) Collector (3) Base</p>	<p>(1) Emitter (2) Collector (3) Base</p>

Magazine taping of TO-92L and TO-92LS : lead formed as shown below.

●Packaging Specifications

(Unit : mm)

TO-92L • TO-92LS Taping					MRT Taping	TO-92L • TO-92LS • MRT Ammo box
Symbol	TO-92L	TO-92LS	Symbol	TO-92L	TO-92LS	
A	5.8±0.2	4.9±0.2	F ₀	5.0 ^{+0.8} _{-0.4}	5.0 ^{+0.8} _{-0.4}	
B	4.8±0.2	3.9±0.2	F ₁	2.5 ^{+0.4} _{-0.2}	2.5 ^{+0.4} _{-0.2}	
C	3.0Min.	3.0Min.	W	18.0 ^{+1.0} _{-0.5}	18.0 ^{+1.0} _{-0.5}	
H	8.0±0.2	8.0±0.2	H ₀	16.0±0.5	16.0±0.5	
d	0.55±0.1	0.55±0.1	W ₀	6.0±0.5	6.0±0.3	
P	12.7±1.0	12.7±1.0	W ₁	9.0±0.5	9.0±0.4	
P ₀	12.7±0.3	12.7±0.3	Δh	0±1.0	0±1.0	
D ₀	φ4.0±0.2	φ4.0±0.2	Δh ₁	0±0.5	0±0.5	
P ₁	6.35±0.4	6.35±0.4	t	0.7±0.2	0.7±0.2	

	W	H	D
TO-92L	340	317	48
TO-92LS	340	270	48
MRT	340	317	48